

2022

# 2022 UAS Weather Technology Forum

TULSA, OKLAHOMA, USA  
AUGUST 16-17, 2022

## **UAS Weather Technology Forum**

**Helmerich Research Center, Oklahoma State University, Tulsa OK**

**Day 1, Tuesday, August 16<sup>th</sup>, 2022**

**8:00am-9:00am: Registration and coffee**

Foyer

**9:00am-9:15am: Welcome**

- Alyssa Avery and Gus de Azevedo, Technical Co-Chairs, OSU

**9:15am-9:30am: Tulsa Innovation Laboratory Overview**

- Daniel Plaisance, Tulsa Innovation Laboratory

**9:30am-10:00am: Introduction**

*Conference Vision and WINDMAP Update*

*The team for Weather Intelligent Navigation Data and Models for Aviation Planning (WINDMAP) will update the community on the most recent plans and progress. WINDMAP is a NASA University Leadership Initiative Program that seeks to address needs in real-time weather forecasting to improve the safety of low altitude aircraft operations from drones to airlines.*

- Jamey Jacob, OSU

**10:00am-11:50am: Extreme Environments**

*"The Coptersonde is in PERILS,"*

- -Elizabeth N. Smith, Tyler M. Bell, Antonio R. Segales, NOAA/OAR/National Severe Storms Laboratory

*"Assessing the Value of Assimilating Surface, PBL, and Free Atmosphere Observations from TORUS on Storm-Scale Ensemble Forecasts"*

- Matthew B. Wilson and Adam L. Houston, University of Nebraska-Lincoln:

*"Skydweller Solar Aircraft Operations at High Altitude."* Skydweller is a US-Spanish aerospace company developing solar powered aircraft solutions capable of achieving perpetual flight.

- Mark Amendt, Skydweller

UAS and balloon data use in severe weather operations

- Steve Piltz Meteorologist in Charge, Tulsa Weather Forecast Office

**Noon: Lunch provided on-site**

### **1:00pm-2:20pm: UAS Data Assimilation**

"UAS Data Assimilation Impacts on Analyses and Short-term predictions on winds and UAS weather hazards"

- Junkyung Kay, James Pinto, Kate Fossell, and Padhrig Mccarthy, National Center for Atmospheric Research

"Toward an Online Optimal Control Algorithm for the TAUS"

- Daniel A. Rico, Carrick J. Detweiler, and Francisco Munoz-Arriola, University of Nebraska-Lincoln

"Integrating wind and weather hazard data into uncrewed aircraft system traffic management (UTM) for improved flight safety"

- Kraettli L. Epperson, Vigilant Aerospace Systems

### **2:30pm-4:00pm: Panel- Engineering Failure and Open Science**

Notable researchers Sean Bailey, Gijs de Boer, Nathan Dunn, Imraan Faruque, and Jamey Jacob will lead an open discussion on failures and missed-approaches that have and will contribute to progress. In addition or organic and entertaining discourse, the panel will discuss failures in operations, equipment, analysis, and implementation.

### **4:00pm-5:00pm: Poster Session**

"Aerostatic UAS Weather Instrument Platform"

- James Little, Anuma Aerospace:

"Atmospheric Research with Kites"

- John Clemmons, Leo Fagge, Kathleen McNamara, Ben Loh, Jamey Jacob, Oklahoma State University

"Experimental Observation of Boundary Layer and Movement of Topographically Varying Desert Dunes with Unmanned Systems"

- Kerrick Ray, Victoria Natalie, and Jamey Jacob, Oklahoma State University

"The SEASCAPE autopilot and its application to wind field estimation"

- Ujjval Patel, Nathan Baker, and Imraan Faruque, Oklahoma State University

"Invariant-EKF design for quadcopter wind estimation"

- Hao Chen, and He Bai, Oklahoma State University

"Urban Air Mobility - Wind Data Collection"

- Braydon Revard, Jamey Jacob, and He Bai, Oklahoma State University

## **Day 2, Wednesday August 17<sup>th</sup>, 2022**

### **8:30am-9:50am: Instrumentation**

"Improvements to the Meteomatics Meteodrone UAS Platform since 2019"

- Brad Guay, and Dr. Lukas Hammerschmidt, Meteomatics

"System Level Barriers to Widespread Weather UAS(s)"

- Nathan Dunn, International Met Systems

"Update on Recent OU CIWRO ARRC UAS Developments,"

- Antonio R. Segales Tyler M. Bell, Elizabeth N. Smith, Elizabeth A. Pillar-Little, Jorge L. Salazar-Cerreno, David Schwartzman, Robert Palmer, and Thomas J. Galarneau, OU, CIWRO, ARRC, NSSL

"Your AI in the sky": Skyfora is a company that uses current scientific understanding and machine learning for atmospheric research including AI empowered weather instruments.

- CEO Fredrik Borgström, Skyfora

### **10:00am-11:50am: Center for Advanced Air Mobility Signing Ceremony**

Join the Governors of Arkansas and Oklahoma in the atrium for a signing ceremony signifying a joint regional collaboration for Advanced Air Mobility.

### **Noon: Lunch provided on-site**

### **1:00pm-2:30pm: Atmosphere-Surface Interactions**

"Initial Perspectives from the TRACER-UAS campaign,"

- Elizabeth A. Pillar-Little, Francesca M. Lappin, Antonio R. Segales, Kelsey Britt, Isaac J. Medina, Leia M. Otterstatter, Bryony Puxley, Michelle R. Spencer, and Petra M. Klein, Cooperative Institute for Severe and High-Impact Weather Research and Operations, Univ of Oklahoma

"Considerations for CopterSonde Use in National Weather Service Operational Forecasting"

- Connor Bruce, Dr. Katie Wilson, and Dr. Pam Heinselman, University of Oklahoma:

"Observations of Surface-Layer Structure During Morning Transition"

- Loiy Al-Ghussain and Sean C.C. Bailey, University of Kentucky

"Initial measurements to support evaluation of surface-atmosphere exchange over areas of complex terrain as part of the SPLASH campaign". Authors include:

- Gijs de Boer, Janet Intrieri, Jonathan Hamilton, Jack Elston, Maciej Stachura, and Jake Longenecker, University of Colorado

**2:30pm-2:40pm: Lessons of a Failure, a Controls Perspective: Imraan Faruque**

**2:45pm-4:00pm: UAS Wind Studies**

“Optimal Frameworks for Flow Field Estimation from Information-aware Flight Paths”

- Abdalrahman Mansy, and Dr. Imraan Faruque, Oklahoma State University

“Observing low altitude features in ozone and meteorology at a shoreline impacted by lake breeze”

- Patricia Cleary, Joe Hupy, and Gijs de Boer, University of Wisconsin- Eau Claire

“Recent Progress in Flight Dynamic Model Based Wind Estimation”

- Craig Woolsey, Virginia Tech

**4:05pm-5:00pm: Panel-The Next Five Years**

The panel will include discussion from a cross-section of the community, Chris Fiebrich, Adam Houston, Victoria Natalie, James Pinto, and Craig Woolsey and on the hopes and expectations for the future. Topics will include anticipated instrumentation, operational developments, and UAS improvements as well as primary investigative topics and possible impact.

**Offsite Cocktail Hour Hosted by Tulsa Innovation Laboratory**

**Day 3, Thursday, August 18<sup>th</sup>, 2022**

**Engineering Research Center for Precision Meteorology Workshop**

Open to all participants – discussion around 2022 NSF ERC proposal submission to establish a National Science Foundation Engineering Research Center for the use of UAS in atmospheric science to improve precision meteorological measurements. All academic and industry participants are welcome to attend.